



Smoking & Tobacco Use

Outbreak of Lung Injury Associated with the Use of E-Cigarette, or Vaping, Products



CDC, the U.S. Food and Drug Administration (FDA), state and local health departments, and other clinical and public health partners are investigating a national outbreak of e-cigarette, or vaping, product use-associated lung injury (EVALI).

[For the Public](#)[For Healthcare Providers](#)[For Health Departments](#)[Resources](#)[Digital Press Kit](#)

Updated December 20, 2019, at 1:00 PM EST

What is New

- **Syndromic data** [🔗](#) on emergency department (ED) visits suggest that the e-cigarette, or vaping, product use-associated lung injury (EVALI) outbreak began in June 2019. Cases have been declining since a peak in September.
 - These data align with recently released epidemiologic data among EVALI patients suggesting that the number of new hospitalized EVALI cases has also been declining since a peak in September.
 - While ED visits associated with possible EVALI have declined, they have not returned to levels before June 2019 and EVALI remains a concern.
- **Laboratory data** [🔗](#) support previous findings that vitamin E acetate is closely associated with EVALI.
 - This study analyzed samples from 51 EVALI cases from 16 states and a comparison group of samples from 99 healthy people for vitamin E acetate, plant oils, medium chain triglyceride (MCT) oil, coconut oil, petroleum distillates, and diluent terpenes.
 - Vitamin E acetate was identified in bronchoalveolar lavage (BAL) fluid samples (fluid samples collected from the lungs) from 48 of the 51 EVALI patients, but not in the BAL fluid from the healthy comparison group.
- **Although we are seeing progress in the investigation and response, we must remain vigilant. National data show that certain groups of EVALI patients released from the hospital are more likely to be rehospitalized or die.**
 - Characteristics of EVALI patients who were readmitted or died following hospital discharge indicate that some chronic medical conditions, including cardiac disease, chronic pulmonary disease, and diabetes as well as increasing age might be risk factors leading to higher morbidity and mortality among some EVALI patients.
- **Based on the findings on EVALI patient rehospitalization and death, CDC has updated its guidance to clinicians to minimize these outcomes.**
 - The updated clinical guidance recommends that hospitalized patients be documented as clinically stable for 24–48 hours prior to discharge.
 - Patients should have a follow-up visit with a primary care provider or pulmonary specialist, optimally within 48 hours of discharge—a shorter follow-up time than the previous recommendation of 1–2 weeks.
 - Healthcare providers should continue to report cases of EVALI to their [state or local health department](#).

CDC will continue to update guidance as we learn more about EVALI.

What We Know

Laboratory Findings Reported December 20, 2019:

- Laboratory data show that [vitamin E acetate](#), an additive in some THC-containing e-cigarette, or vaping, products, is closely associated with EVALI.
 - A [recent study](#) [🔗](#) analyzed samples from 51 EVALI cases from 16 states and a comparison group of samples from 99 healthy people for vitamin E acetate, plant oils, medium chain triglyceride (MCT) oil, coconut oil, petroleum distillates, and diluent terpenes.
 - Vitamin E acetate was identified in bronchoalveolar lavage (BAL) fluid samples (fluid samples collected from the lungs) from 48 of the 51 EVALI patients, but not in the BAL fluid from the healthy comparison group.
 - No other toxicants were found in BAL fluid from either group, except for coconut oil and limonene (1 EVALI patient each).

- This study built upon a previously released [CDC report](#), using a large number of BAL fluid samples from EVALI patients, and added healthy controls, and yielded the same finding.
- These findings complement the [ongoing work of FDA](#) and some state public health laboratories to characterize e-liquid exposures and inform the ongoing multistate outbreak.

About the Outbreak:

- CDC is only reporting hospitalized EVALI cases and EVALI deaths regardless of hospitalization status. CDC has removed nonhospitalized cases from previously reported case counts. **See [Public Health Reporting for more information](#).**
- **As of December 17, 2019**, a total of 2,506 hospitalized EVALI cases have been reported to CDC from all 50 states, the District of Columbia, and two U.S. territories (Puerto Rico and U.S. Virgin Islands).
 - Fifty-four deaths have been confirmed in 27 states and the District of Columbia (**as of December 17, 2019**).
- [Syndromic data](#) on emergency department (ED) visits suggest that the EVALI outbreak began in June 2019. Cases have been declining since a peak in September.
 - Data suggest two distinct periods: a gradual increase in ED visits associated with e-cigarette use since 2017, followed by a sharp rise in June 2019.
 - Data suggest that the EVALI outbreak began in the summer of 2019, and has been on the decline since September 2019.
 - These data align with recently released epidemiologic data among EVALI patients suggesting that the number of new hospitalized EVALI cases has also been declining since a peak in September.
 - While ED visits associated with possible EVALI have declined, they have not returned to levels before June 2019 and EVALI remains a concern.
- Although the number of reported cases appears to be declining, states are still reporting new hospitalized EVALI cases to CDC on a weekly basis and should remain vigilant with EVALI case finding and reporting.


About Patient Exposure:

- All EVALI patients have reported a history of using e-cigarette, or vaping, products.
 - Vitamin E acetate has been identified as a chemical of concern among people with e-cigarette, or vaping, product use-associated lung injury (EVALI).
 - THC is present in most of the samples tested by FDA to date, and most patients report a history of using THC-containing products.
 - The latest national and state findings suggest THC-containing e-cigarette, or vaping, products, particularly from informal sources like friends, family, or in-person or online dealers, are linked to most of the cases and play a major role in the outbreak.
- CDC has analyzed national data on use of THC-containing product brands by EVALI patients.
 - Overall, 152 different THC-containing product brands were reported by EVALI patients.
 - Dank Vapes, a class of largely counterfeit THC-containing products of unknown origin, was the most commonly reported product brand used by patients nationwide, although there are [regional differences](#). While Dank Vapes was most commonly reported in the Northeast and South, TKO and Smart Cart brands were more commonly reported by patients in the West and Rove was more common in the Midwest.
 - The data further support that EVALI is associated with THC-containing products and that it is not likely associated with a single THC-containing product brand.


What We Don't Know

- While it appears that vitamin E acetate is associated with EVALI, there are many different substances and product sources that are being investigated, and there may be more than one cause.

What CDC Recommends


- CDC and FDA recommend that people should not use THC-containing e-cigarette, or vaping, products, particularly from informal sources like friends, family, or in-person or online sellers.
- Vitamin E acetate should not be added to e-cigarette, or vaping, products. Additionally, people should not add any other substances not intended by the manufacturer to products, including products purchased through retail establishments.
- While it appears that vitamin E acetate is associated with EVALI, there are many different substances and product sources that are being investigated, and there may be more than one cause. Therefore, the best way for people to ensure that they are not at risk while the investigation continues is to consider refraining from the use of all e-cigarette, or vaping, products.
- Adults using e-cigarettes or vaping products as an alternative to cigarettes should not go back to smoking; they should weigh all available information and consider utilizing [FDA-approved cessation medications](#) . They should contact their healthcare provider if they need help quitting tobacco products, including e-cigarettes.
- Adults who continue to use an e-cigarette, or vaping, product should carefully monitor themselves for symptoms and see a healthcare provider immediately if they develop [symptoms](#) like those reported in this outbreak.

If you are an adult trying to [quit](#) smoking:

- Contact a healthcare provider for help quitting tobacco products, including e-cigarettes.
- Use evidence-based treatments, including counseling and [FDA-approved cessation medications](#) .

If you are concerned about your health after using an e-cigarette, or vaping, product, contact your healthcare provider or local poison control center at [1-800-222-1222](tel:1-800-222-1222).

Adults with ongoing cannabis (marijuana) use that leads to significant impairment or distress should seek out evidence-based behavioral treatment.

- Effective treatments are available, and recovery is possible. A number of therapy-based treatments such as cognitive-behavioral therapy, contingency management, motivational enhancement therapy, and multi-dimensional family therapy have been shown to be effective.
- Visit [Substance Abuse and Mental Health Services Administration's Treatment Locator](#)  to locate treatment in your area or call [1-800-662-HELP](tel:1-800-662-HELP) (4357).

For adults currently using marijuana/THC-containing e-cigarette, or vaping, products for medical use: We do not know if there are different health effects of using different forms of marijuana, such as smoking, vaping, and edibles, or whether transitioning from one form to another might reduce harm. Talk with your healthcare provider about other available treatment options for the conditions.

- Regardless of the ongoing investigation:

- E-cigarette, or vaping, products should never be used by youths, young adults, or women who are pregnant.
- Adults who do not currently use tobacco products should not start using e-cigarette, or vaping, products. There is no safe tobacco product. All tobacco products, including e-cigarettes, carry a risk.
- THC use has been associated with a wide range of health effects, particularly with prolonged frequent use. The best way to avoid potentially harmful effects is to not use THC-containing e-cigarette, or vaping, products. Persons engaging in ongoing cannabis (marijuana) use that leads to significant impairment or distress should seek evidence-based treatment by a healthcare provider.

CDC will continue to update guidance, as appropriate, as new data becomes available from this complex outbreak.

Key Facts about Use of E-Cigarette, or Vaping, Products

- Electronic cigarettes—or e-cigarettes—are also called vapes, e-hookahs, vape pens, tank systems, mods, and electronic nicotine delivery systems (ENDS).
- Using an e-cigarette is commonly called vaping.
- E-cigarettes work by heating a liquid to produce an aerosol that users inhale into their lungs.
- The liquid can contain: nicotine, tetrahydrocannabinol (THC) and cannabinoid (CBD) oils, and other substances, flavorings, and additives. THC is the psychoactive mind-altering compound of marijuana that produces the “high.”

Key Facts about Vitamin E Acetate

- Vitamin E acetate is used as an additive, most notably as a thickening agent in THC-containing e-cigarette, or vaping, products.
- Vitamin E is a vitamin found in many foods, including vegetable oils, cereals, meat, fruits, and vegetables. It is also available as a dietary supplement and in many cosmetic products, like skin creams.
- Vitamin E acetate usually does not cause harm when ingested as a vitamin supplement or applied to the skin. However, previous research suggests that when vitamin E acetate is inhaled, it may interfere with normal lung functioning.

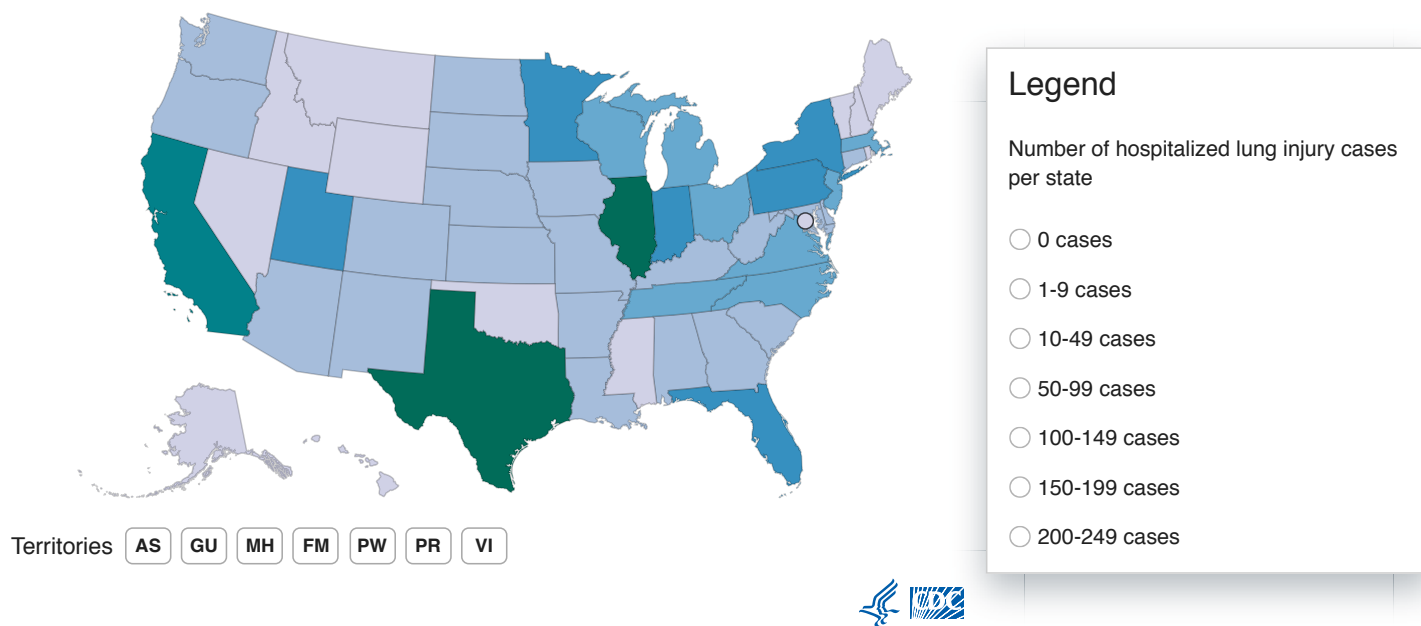
If you have questions about CDC’s investigation into the lung injuries associated with use of e-cigarette, or vaping, products, contact [CDC-INFO](#) or call 1-800-232-4636.

Latest Outbreak Information

- This complex investigation spans all states, involves over 2,500 patients, and a wide variety of brands and substances and e-cigarette, or vaping, products.
- **As of December 3, 2019**, CDC is only reporting hospitalized EVALI cases and EVALI deaths regardless of hospitalization status. CDC has removed nonhospitalized cases from previously reported case counts. **See [Public Health Reporting](#) for more information.**
- **As of December 17, 2019**, a total of 2,506 cases of hospitalized e-cigarette, or vaping, product use-associated lung injury (EVALI) have been reported to CDC from 50 states, the District of Columbia, and two U.S. territories (Puerto Rico and U.S. Virgin Islands).
- Fifty-four deaths have been confirmed in 27 states and the District of Columbia **(as of December 17, 2019)**:
 - Alabama, California, Connecticut, Delaware, District of Columbia, Florida, Georgia, Illinois, Indiana, Kansas, Louisiana, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Jersey, New York, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Utah, and Virginia
 - The median age of deceased patients was 52 years and ranged from 17 through 75 years **(as of December 17, 2019)**.
 - More deaths are currently under investigation.
- Data suggest the outbreak peaked in September 2019. However, states continue to report new cases, including deaths, to CDC on a weekly basis.
- Among cases of hospitalized EVALI patients reported to CDC with available data **(as of December 3, 2019)**:
 - 67% were male (among 2,155 patients with data on sex)
 - 78% were under 35 years old, with a median age of 24 years and age range from 13 to 77 years (among 2,159 patients with data on age)
 - By age group category:
 - 16% of patients were under 18 years old;
 - 38% of patients were 18 to 24 years old;
 - 24% of patients were 25 to 34 years old; and
 - 23% of patients were 35 years or older.
- 1,782 hospitalized patients had complete information* on substances used in e-cigarette, or vaping, products in the 3 months prior to symptom onset, of whom **(as of December 3, 2019)**:
 - 80% reported using THC-containing products; 35% reported exclusive use of THC-containing products.
 - 54% reported using nicotine-containing products; 13% reported exclusive use of nicotine-containing products.
 - 12% reported using cannabidiol (CBD)-containing products; 1% reported exclusive use of cannabidiol (CBD)-containing products.
 - 40% reported both THC- and nicotine-containing product use.
 - 5% reported no THC-, nicotine-, or CBD-containing product use.
- Among hospitalized EVALI patients who reported using THC-containing e-cigarette, or vaping product brands:
 - The most commonly reported product brand included Dank vapes (56%), followed by TKO (15%), Smart Cart (13%), and Rove (12%). However, regional differences in THC-containing product use were noted.

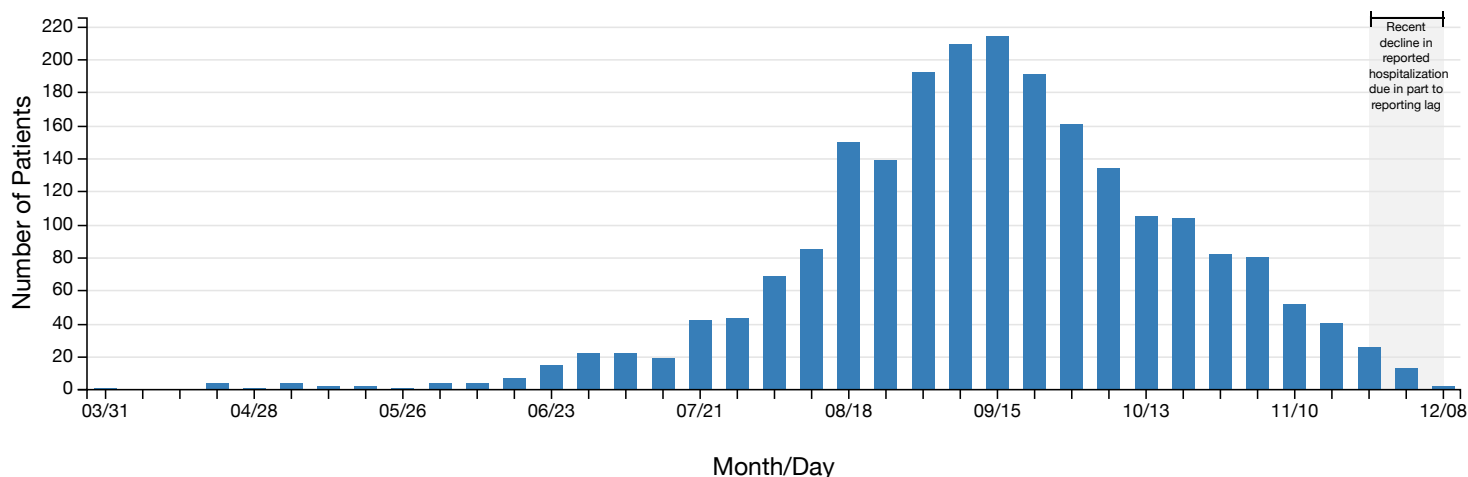
* Based on complete reports received.

Number of Hospitalized Lung Injury Cases Reported to CDC as of December 17, 2019



Dates of hospital admission for patients with lung injury associated with e-cigarette, or vaping, product use — United States, March 31–December 14, 2019

☐ Date of Admission (N=2241) [Reset](#)



Data Table

	03/31/2019	04/07/2019	04/14/2019	04/21/2019	04/28/2019	05/05/2019	05/12/2019	05/19/2019
Date of Admission (N=2241)	1	0	0	4	1	4	2	2

[Scroll for additional info](#)

Region Name	Start Date	End Date
Recent decline in reported hospitalization due in part to reporting lag	11/24/2019	12/8/2019

What CDC is Doing

Public Health Response:

- CDC's Lung Injury response efforts are committed to:
 - Identify and define the risk factors and the source for e-cigarette, or vaping, product use-associated lung injury (EVALI).
 - Detect and track confirmed and probable cases in the US.
 - Communicate actionable recommendations to state, local, and clinical audiences.
 - Establish lab procedures that can assist with the public health investigation and patient care.

Partnerships:

- CDC is working 24/7 to identify the cause or causes of this outbreak.
- CDC continues to work closely with FDA, states, public health partners, and clinicians on this investigation by providing consultation and technical assistance to states on communication, health alerts, public outreach, and

surveillance.

- CDC has activated the Emergency Operations Center (EOC) to coordinate activities and provide assistance to states, public health partners, and clinicians around the nation.
- CDC worked with states to create [case definitions](#) to classify confirmed and probable cases in a consistent way. States are in the process of classifying patients.
 - CDC will report numbers of confirmed and probable lung injury cases once states have finalized their classification of cases.
- By invitation, CDC has deployed Epidemic Intelligence Service (EIS) officers and other CDC staff to support states.
- CDC has been communicating with international public health partners. Currently, there is a very small number of similar lung injuries outside the U.S. and not close to the magnitude in the U.S.

Media and Communication:

- CDC is maintaining an outbreak webpage with key messages and weekly updates on case counts, deaths, and [resources](#) available to healthcare providers, health departments, and the public.
- CDC is holding congressional briefings, media telebriefings, and regular calls with health departments, clinicians to provide timely updates.

Laboratory Testing:

- CDC is currently testing bronchoalveolar lavage (BAL) fluid samples as well as blood or urine samples paired to BAL fluid samples.
- CDC is testing pathologic specimens, including lung biopsy or autopsy specimens, associated with patients.
- CDC is offering aerosol emissions testing of case-associated product samples from e-cigarette, or vaping, products, and e-liquids paired to BAL fluid samples (samples do not need to be submitted at the same time to meet this requirement). For more information about submission, see [Product Sample Submission Information](#).
- Results can help provide insight into the nature of chemical exposure(s) contributing to this outbreak.
- CDC developed [guidance documents](#) to assist public health laboratories, healthcare providers, pathologists, and others with specimen collection, storage, and submission to CDC for testing.
- For more information and resources, visit [For the Public](#), [For Healthcare Providers](#) and [For State and Local Health Departments](#) as well as our [Publications and Resources](#) page.

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Content source: [Office on Smoking and Health](#), [National Center for Chronic Disease Prevention and Health Promotion](#)